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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,829	09/23/2005	Hartmut Mahlkow	2005-295	1743
27569	7590	10/26/2007		
PAUL AND PAUL 2000 MARKET STREET SUITE 2900 PHILADELPHIA, PA 19103			EXAMINER CULBERT, ROBERTS P	
			ART UNIT	PAPER NUMBER
			1792	
			NOTIFICATION DATE	DELIVERY MODE
			10/26/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/550,829	<b>Applicant(s)</b> MAHLKOW ET AL.	
	<b>Examiner</b> Roberts Culbert	<b>Art Unit</b> 1763	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 September 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 9/6/07 have been fully considered but they are not persuasive.

Applicant has argued that Shipley and Goffinet do not disclose a solution that is free of sulfate ions. In support applicant points out that trace amounts of sulfuric acid are contained in sulfonic acids sold on the market contain 2-5% sulfate ions, and applicant defines a solution free of sulfate ions as being less than 0.2%(w/v).

The argument is not persuasive because the references meet the definition of a solution that is free of sulfate ions. Shipley, and similarly, Goffinet, teach a concentration of 20g/l which, since commercial phenol sulfonic acid contains less than 2 % sulfate ions, results in a concentration of less than 0.04 g/l sulfate ions.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claim 1, 6 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by GB 1 546 524 to Shipley.**

Regarding Claim 1 Shipley teaches a solution for etching copper or a copper alloy, said solution having a pH on the order of 4 or less, comprising:

- a) at least one oxidizing agent selected from the group comprising hydrogen peroxide and peracids and
- b) at least one substance selected from the group comprising aromatic sulfonic acids and salts of the aromatic sulfonic acids characterized in that the solution is free of sulfate ions. (Examples 26-28)

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Regarding Claim 6, Shipley teach that the concentration of the substances is in the range of from about 5 to about 250 g/l.

Regarding Claim 8, Shipley teach the aromatic part of at least one aromatic sulfonic acid or of at least one salt of the aromatic sulfonic acids comprises at least one phenyl group.

Regarding Claim 9, Shipley teach that at least one phenyl group is substituted by one or more radicals selected from the group comprising nitro, amino, hydroxy, halogen, C<sub>1</sub>-C<sub>5</sub> alkyl radicals and C<sub>1</sub>-C<sub>5</sub> alkoxy radicals.

Regarding Claim 10, Shipley teach that at least one aromatic sulfonic acid is selected from the group comprising benzene sulfonic acid, phenol sulfonic acid, toluene sulfonic acid, amino benzene sulfonic acid and naphthalene sulfonic acid.

**Claim 1, 6, 8-10 and 12-14, 17 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by FR 2 392 100 A. to Goffinet.**

Regarding Claims 1, 6, 8-10, 12-14, 17, and 19, the Goffinet teach a solution for etching copper to improve the adherence of coatings comprising the process and a solution for etching copper. The solution contains 200 g/l H<sub>3</sub>PO<sub>4</sub>, 40 g/l H<sub>2</sub>O<sub>2</sub> and 20 g/l of a phenol derivate, which is phenol sulfonic acid according to page 3, line 24 (example 1).

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2-5, 7, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over FR 2 392 100 A to Goffinet in view of U.S. Patent 6,036,758 to Fairweather et al.**

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Regarding Claims 2-5, and 7, as applied above, Goffinet teaches the method of the invention substantially as claimed, but does not expressly teach at least one N-heterocyclic compound in the range of about 0.1 to about 300 g/l. However, Fairweather et al. teach teaches a solution for etching copper or a copper alloy, said solution having a pH on the order of 4 or less, comprising: at least one oxidizing agent selected from the group comprising hydrogen peroxide and peracids and at least one substance selected from the group comprising aromatic sulfonic acids and salts of the aromatic sulfonic acids, and further comprising at least one N-heterocyclic compound in the range of about 0.1 to about 300 g/l. It would have been obvious to one of ordinary skill in the art at the time of invention to include a corrosion inhibitor as suggested by Fairweather et al.

Regarding Claims 15 and 16, Fairweather et al teach pre-cleaning with acid prior to the step of etching. (Col. 3, Lines 45-51) Although sulfuric acid is not expressly recited for the pre-clean, selection from acids such as sulfuric would have been obvious to one of ordinary skill in the art. Further there is no indication that the step of pre-cleaning is critical to the invention, since no effect is described.

**Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over FR 2 392 100 A in view of EP 1 167585 A2 to Hongo et al.**

Regarding Claim 11, as applied above, Goffinet teaches the method of the invention substantially as claimed, but does not expressly teach at least one adjuvant selected from the group comprising polyethylene glycol, polypropylene glycol and the derivatives thereof. However, Hongo et al. teach that an acid solution for etching copper comprises at least one adjuvant selected from the group comprising polyethylene glycol, polypropylene glycol and the derivatives thereof. It would have been obvious to one of ordinary skill in the art at the time of invention to include least one adjuvant selected from the group comprising polyethylene glycol, polypropylene glycol in order to increase the solution viscosity in the well known manner. (Paragraph 37-41)

**Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over FR 2 392 100 A to Goffinet.**

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Regarding Claim 18, do not expressly teach that the metal is electroless nickel-gold or chemical tin. However, Official Notice is taken by the examiner that nickel-gold and tin are well known for coating a copper layer in the circuit forming arts. Further, there is no indication that the material is a critical feature of the invention.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



R. Culbert  
Examiner  
Art Unit 1763